

REMARKS

The Specification has been amended to correct obvious clerical errors, and to employ more idiomatic English. Additionally, the Specification and the Abstract have been amended to incorporate the language change suggested in paragraph 2 of the action.

The claims have been amended to better define Applicant's claimed invention, to correct obvious clerical errors and to better define Applicant's claimed invention and to distinguish Applicant's claimed invention from the prior art.

Turning to the art rejections, and considering first the rejection of claims 1-4, 7 and 8 as obvious from Roberts et al in view of Miller et al, and the rejection of claims 1-4, 7 and 8 as obvious from McDavid in view of Miller et al, it is noted that neither primary reference Roberts et al and McDavid et al teach or suggest a semiconductor device including both the large-diameter contact hole and a small-diameter contact hole as required by Applicant's independent claim 1. Thus, neither Roberts et al nor McDavid et al encounters or addresses the technical problems to which the subject application is directed, i.e. assuring stable contact resistance in both enlarged-diameter contact holes and small-diameter contact holes in an integrated circuit. Accordingly, there is no teaching or suggestion in either primary reference of a semiconductor device having both a large-diameter contact hole and a small-diameter contact hole in which the small-diameter contact hole is completely filled with a plug of refractory conductive material, while the large-diameter contact hole is partly filled by the refractory

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conductive material which covers a sidewall surface of the large-diameter contact hole to lower then the upper end of the large-diameter contact hole as required by Applicant's claim 1, as amended.

It is not seen that the Miller et al reference supplies the missing teachings to either Roberts et al or McDavid et al to achieve or render obvious Applicant's claim 1, or the various claims dependent thereon. Miller has been cited as teaching the filling of a high aspect ratio hole with a refractory metal plug, and is acknowledged as so teaching. However, there is no disclosure or suggest in Miller et al of a semiconductor device having both large-diameter contact holes and small-diameter contact holes as required by Applicant's claimed invention, or the technical problems associated with achieving stable contact resistance in both the large-diameter contact holes and the small-diameter contact holes which is a basic object of Applicant's claimed invention. Thus, no combination of Roberts et al and Miller or McDavid and Miller reasonably can be said to achieve or render obvious independent claim 1, or the claims 2-4, 7 and 8 dependent thereon.

Turning to the rejection of claims 5, 6, 9 and 10 as obvious from McDavid and Roberts et al in view of Miller et al, claims 5, 6, 9 and 10 are indirectly dependent on claim 1, and therefore must be construed to include the limitations of claim 1. As noted *supra*, none of the art citations taken alone or in combination teach a semiconductor device construction including both large-diameter contact holes and small-diameter contact holes as required by Applicant's claimed invention, and in which the small-

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diameter holes are completely filled with a plug of refractory conductive material, while the large diameter contact holes are partially filled by a refractory conductive metal which covers a sidewall surfaces thereof to below the upper end of the large-diameter contact hole as required by Applicant's claimed invention, and the advantages resulting therefrom. In fact, there is no disclosure or suggestion in any of the art cited by the Examiner of the technical problems of contact hole disconnect in semiconductor devices which include both large-diameter contact holes and small-diameter contact holes as required by Applicant's claimed invention. Accordingly, and in view of these basic missing teachings and the significant advantages of Applicant's claimed invention over the prior art, it is submitted that the rejection of the claims, as amended, is in error.

In the event there are any fee deficiencies or additional fees are payable, please charge them (or credit any overpayment) to our Deposit Account No. 08-1391.

Respectfully submitted,


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I hereby certify that this correspondence is being deposited with the United States Postal Service as First Class Mail in an envelope addressed to: Commissioner of Patents and Trademarks, Washington, D.C. 20231 on March 8, 1999, at Manchester, New Hampshire.

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